

66. (New) The motor of claim 65 where the linear coefficient of thermal expansion of the thermoplastic is less than 2.0×10^{-5} in/in/°F throughout the range of 0-250°F.

67. (New) The motor of claim 65 where the terminal is a copper pad.

REMARKS

The amendment does not involve new matter. The changes to the specification and claims from the previous version to the rewritten version are shown in Appendix A, with added matter underlined. The amendment on page 8 corrects a typographical error. Pages 27-28 were amended to include a description of the type of ceramic and its level of use in one particularly preferred thermoplastic material. This added information is not new matter as it is inherent in the original disclosure. In support thereof, attached as Appendix B is a copy of a facsimile from George Niznik, Vice President of LNP Technology. LNP is the supplier of the Konduit thermoplastic. This facsimile shows that the Konduit material described in the original specification has had 55% aluminum oxide since the product was developed in November 1996, well before the filing date of the present application and provisional application Serial No. 60/146,446 on which priority is based. It is further submitted that one of ordinary skill in the art at the time the application was filed could have analyzed Konduit OTF-212-11 and found that it contained 55% aluminum oxide. Hence this further description of the product does not include new matter. The paragraph is also corrected in that Fortron 4665 polymer is a PPS (polyphenyl sulfide) polymer rather than a PBS polymer.

Claim 36 has been converted to independent form. New claim 61 uses limitations from claim 60. Claim 62 is supported by the amended paragraph on pages 27 and 28. Claims 63 and 64 are patterned after claims 3 and 8. Claim 65 uses limitations from claim 59.

Claim 66 is patterned after claim 49. Claim 67 is supported by page 9, lines 1-2.

In the outstanding Office Action, claims 1, 3-26, 29-37, 39 and 43-47 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,986,365 (Kuwert). This rejection is respectfully traversed in view of the foregoing amendment. Claim 1 is directed to a motor comprising a shaft, a bearing and a stator assembly that

includes a body of phase change material encapsulating a stator. One of the shaft or bearing is fixed to the stator assembly by the body of phase change material, with the body of phase change material being in contact with the bearing or shaft. In Kuwert the central spindle 2 is fixed to the base flange 1, but is not in contact with elastic mass 16. Claim 1 is thus not anticipated by Kuwert. Nor would it have been obvious to modify Kuwert to have the central spindle 2 in contact with the elastic mass 16. claim 1, and claims 3, 8-15, 18-26, 29-35, 39 and 45-47 dependent thereon are not anticipated by Kuwert.

Claim 36 requires a solid insert substantially encapsulated in the body of phase change material, which also substantially encapsulates the stator. No such insert is encapsulated in the elastic mass 16 of Kuwert. Claim 16, and claims 37 and 43-44 dependent thereon, are thus not anticipated by Kuwert.

Claim 57 was rejected in the outstanding Office Action under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,002,185 (Nakao). This rejection is also respectfully traversed in view of the foregoing amendment. Claim 57 requires a motor with a stator substantially encapsulated in a thermoplastic body so as to rigidly fix the stator and body together, the thermoplastic body having a cylindrical hole therein with a bearing press fit into and in contact with the thermoplastic body. In Nakao the bearing 3 is not in contact with the molded main body 30. Rather, a "bush 23" is insert molded into the molded main body 23, and the bush 23 holds the top bearing 3. Thus claim 57 is not anticipated by Nakao. Nor would it have been obvious to modify Nakao to have the bearing 3 in direct contact with the molded main body 30, because the main body 30 is made from a polymer to which alkene elastomer has been added so that the molded main body 30 is elastic. Col. 4, lines 33-35. Since the main body 30 is elastic, it cannot be used to hold the bearing 3 directly, since the bearing 3 must be held fairly rigidly. Thus claim 57 is patentable over Nakao.

Claim 27-28, 40 and 44 were rejected in the outstanding Office Action under 35 U.S.C. § 103(a) as being unpatentable over Kuwert. This rejection is respectfully traversed. Claims 27-28 and 40 are ultimately dependent on claim 1. Claim 44 is ultimately dependent on claim 36. The patentability of claims 1 and 36 over Kuwert is explained above. There is no obvious modification of Kuwert that would produce the

invention of claims 1 and 36. Thus these claims, and claims 27-28, 40 and 44 dependent thereon, are patentable over Kuwert.

In the outstanding Office Action claims 41 and 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kuwert in view of U.S. Patent No. 5,694,268 (Dunfield). This rejection is also respectfully traversed. Claims 41 and 42 are dependent on claim 36. Claim 36 requires a solid insert substantially encapsulated within the body of phase change material. Neither Kuwert nor Dunfield disclose a solid insert substantially encapsulated in a body of phase change material that also substantially encapsulates the stator. The Office Action asserts that Kuwert discloses the insert, but does not specify what part of Kuwert constitutes the insert. The Office Action also asserts that Dunfield discloses inserts dampening motor vibration and audible noise. While Dunfield discloses an overmold encapsulating at least a part of a stator to mechanically isolate the stator from the base of the hard disc drive and thereby reduce acoustic noise generation, the Office Action does not state what element of Dunfield is considered to be the "insert", nor can Applicant's attorney find an insert that enhances dampening of motor vibration or dampening of audible noise, as required by claims 41 and 42, in the Dunfield disclosure. The Examiner is invited to identify the insert considered to meet this limitation. Otherwise this rejection should be withdrawn.

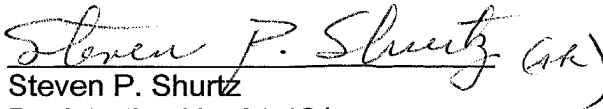
Claims 2, 38, 48-56 and 58-60 were rejected in the outstanding Office Action for obviousness-type double patenting over U.S. Patent No. 6,300,695. Without acquiescing to the correctness of the rejection, enclosed is a terminal disclaimer to overcome the rejection.

Since all of the outstanding rejections have been overcome, an early notice of allowance is respectfully requested. If the Examiner wishes to discuss any other details before mailing a notice of allowance, he is invited to telephone Applicant's attorney.

Respectfully submitted,

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APPENDIX A

Rewrite the paragraph on page 8, lines 17-24, as follows:

As shown in FIG. 4, a shaft 16 is connected to the hub or disc support member 12 and is surrounded by bearings 18, which are adjacent against the body 14. A rotor or magnet 28 is fixed to the inside of the hub 12 on a flange so as to be in operable proximity to the stator. The magnet 28 is preferably a permanent magnet, as described below. The body 14 includes a base 22. In addition, mounting features, such as apertures 25, and terminals comprising a connector 26 for connecting the conductors to an external power source are formed as a part of the stator assembly. The terminals making up the connector 26 are partially encapsulated in the body 14.

Please rewrite the paragraph on pages 27, line 24 to page 28, line 8 as follows:

One preferred thermoplastic material, Konduit OTF-212-11, which contains 55% aluminum oxide as a filler, was made into a thermoplastic body and tested for its coefficient of linear thermal expansion by a standard ASTM test method. It was found to have a CLTE in the range of -30 to 30°C of 1.09×10^{-5} in/in/°F in the X direction and 1.26×10^{-5} in/in/°F in both the Y and Z directions, and a CLTE in the range of 100 to 240°C of 1.28×10^{-5} in/in/°F in the X direction and 3.16×10^{-5} in/in/°F in both the Y and Z directions. (Hence, the relevant CLTEs for purposes of defining the invention are 1.09×10^{-5} in/in/°F and 1.28×10^{-5} in/in/°F.) Another similar material, Konduit PDX-0-988, was found to have a CLTE in the range of -30 to 30°C of 1.1×10^{-5} in/in/°F in the X direction and 1.46×10^{-5} in/in/°F in both the Y and Z directions, and a CLTE in the range of 100 to 240°C of 1.16×10^{-5} in/in/°F in the X direction and 3.4×10^{-5} in/in/°F in both the Y and Z directions. By contrast, a [PBS] PPS type polymer, (Fortron 4665) was likewise tested. While it had a low CLTE in the range of -30 to 30°C (1.05×10^{-5} in/in/°F in the X direction and 1.33×10^{-5} in/in/°F in both the Y and Z directions), it had a much higher CLTE in the range of 100 to 240°C (1.94×10^{-5} in/in/°F in the X direction and 4.17×10^{-5} in/in/°F in both the Y and Z directions).

1. (Twice amended) A high speed spindle motor comprising:

- a) a stator assembly comprising:
 - i) a stator having multiple conductors that create a plurality of magnetic fields when electrical current is conducted by the conductors; and
 - ii) a body of a phase change material substantially encapsulating the stator so as to rigidly fix the stator and body together;
- b) a rotatable hub having a magnet connected thereto in operable proximity to the stator;
- c) a shaft;
- d) a bearing around the shaft; and
- e) one of the shaft or bearing being fixed to the stator assembly by the body of phase change material and being in contact therewith; and the other of the shaft or bearing being fixed to the rotatable hub.

9. (Amended) The high speed motor of claim [8] 3 wherein the stator further comprises a core and the conductors induce magnetic fields in the core when current is conducted by the conductors.

36. (Amended) [The high speed motor of claim 1] A high speed spindle motor comprising:

- a) a stator assembly comprising:
 - i) a stator having multiple conductors that create a plurality of magnetic fields when electrical current is conducted by the conductors;
 - ii) a body of a phase change material substantially encapsulating the stator so as to rigidly fix the stator and body together; and
 - iii) a solid insert [is] substantially encapsulated within the body;
- b) a rotatable hub having a magnet connected thereto in operable proximity to the stator;
- c) a shaft;
- d) a bearing around the shaft; and
- e) one of the shaft or bearing being fixed to the stator assembly and the other of the shaft or bearing being fixed to the rotatable hub.

57. (Twice amended) A high speed spindle motor comprising:
- a) a stator substantially encapsulated in a thermoplastic body so as to rigidly fix the stator and body together, the thermoplastic body having a cylindrical hole therein;
 - b) a bearing press fit into the cylindrical hole in contact with the thermoplastic body;
 - c) a shaft rotatably supported by the bearing; and
 - d) a hub having a magnet connected thereto, the hub being fixed to the shaft.

Appendix B

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Product Code
771-999-806

Description
KONDUIT OTF-212-11

General Description

Grade	OTF21211	Color	Pid
Percent	* Component	Description	
20.000	127-715	TICONA FORTRON POWDER	PPS
10.000	141-049	PPG 1/8"	Glass Fiber
55.000	151-100	UNIT. MIN. UNI-KOTE ALO 	Aluminum Oxide
14.500	127-706	TICONA FORTRON POWDER	PPS
.500	156-035		Lubricant

Bottom

* Press F4 for further information on this field

Highlighted Products are Discontinued

Date Entered..... 11/22/96 Num of Spec Inst for All Custs: 001

Specification Date: 2/26/02 Revision: J

Unit of Measure.... POUNDS Last Sale: 12/27/02 Last Inventory: 1/06/03

F1=Exit F3=Refresh F5=INV balances F6=RM balances F7=Special instr.

F8=Q.C. specs. F10=Hazards F11=Classifiers F12=Data sheet F24=More keys

To Whom It May Concern,

The above formulation is that of Konduit OTF-212-11, which was entered as a product on November 22, 1996. The above formulation has redacted portions which refer to highly proprietary raw material product designations. Fortron is the trade name for Ticona's PPS resin, grade redacted. PPG is the fiber glass supplier, grade redacted. ALO is the product designation for Aluminum Oxide, grade redacted. The 6 digit codes, i.e., 127-715, 151-100 refer to PPS and Aluminum Oxide respectively in our Approved Raw Material List inventory.

This statement is accurate and true,
Greg S. Spivey
President, LNP Technology